CLAIMS

1. A method of forming a chemical hydride, comprising:

providing a composition which is capable of forming a chemical hydride;

forming a solution of the composition; and

creating an ionized oxygen gas over the solution of the composition to encourage the formation of the chemical hydride in the solution.

2. A method as claimed in claim 1, and wherein the composition capable of forming a chemical hydride comprises metaborate, and wherein the step of forming a solution of the composition further comprises:

providing a source of water and mixing the metaborate with the source of water.

3. A method as claimed in claim 1, and wherein the step of creating an ionized gas over the solution of the composition comprises creating an oxygen plasma over the solution of the composition.

4. A method as claimed in claim 1, and wherein after the step of forming a solution of the composition, and before the step of creating an ionized oxygen gas over the solution, the method further comprises:

providing a pseudo-plasma-electrolysis reactor which encloses the solution formed of the composition; and

creating an electrical current in the solution of the composition to form the ionized oxygen gas over the solution.

5. A method as claimed in claim 4, and wherein the step of providing a pseudo-plasma-electrolysis reactor further comprises:

providing a cathode which is mounted in a fixed location in the pseudo-plasma-electrolysis reactor and which is further in electrical contact with the solution formed of the composition;

providing an anode which is moveably mounted in the pseudo-plasma-electrolysis reactor;

moving the anode into, and out of, direct fluid contact with the solution of the composition; and

providing a source of electrical power and coupling the source of electrical power to the anode and the cathode.

6. A method as claimed in claim 5, and wherein the step of creating the ionized oxygen gas over the solution of the composition further comprises:

first, moving the anode into direct fluid contact with the solution of the composition;

second, energizing the anode and the cathode to create an electrical current through the solution of the composition and between the anode and the cathode to establish an initial conventional electrolysis to generate the oxygen gas at the anode; and

third, while generating the oxygen gas, moving the anode out of fluid contact with the solution of the composition to create the ionized oxygen gas over the solution of the composition.

7. A method as claimed in claim 1, and further comprising:

providing a gas cooled nuclear reactor which has a hot gas exhaust having heat energy;

providing a first heat exchanger coupled in fluid flowing relation relative the hot gas exhaust, and wherein the first heat exchanger absorbs a portion of the heat energy from the hot gas exhaust;

coupling the solution of the composition in fluid flowing relation relative to the first heat exchanger; and wherein the heat energy absorbed by the first heat exchanger heats the solution of the composition to a temperature;

providing a second heat exchanger coupled in fluid flowing relation relative to the hot gas exhaust, and wherein the second heat exchanger absorbs a portion of the heat energy from the hot gas exhaust;

providing a source of water to the second heat exchanger, and wherein the heat energy absorbed by the second heat exchanger converts the water into high pressure steam;

providing a steam turbine and supplying the high pressure steam to the steam turbine to produce a mechanical energy output;

providing an electrical generator and coupling the electrical generator to the mechanical energy output to generate electrical power; and

supplying the electrical power to create the ionizing gas over the solution.

8. A method of forming a chemical hydride, comprising:

providing a pseudo-plasma-electrolysis reactor defining a cavity;

providing a cathode and mounting the cathode in a fixed location in the cavity;

providing a moveable anode, and mounting the anode for movement within the cavity;

supplying an aqueous solution of sodium metaborate, and water, to the cavity of the pseudo-plasma-electrolysis reactor and wherein the cathode is submerged in the aqueous solution;

providing a nuclear reactor which simultaneous heats the aqueous solution of the sodium metaborate and water, and further generates electrical power; and

supplying the electrical power generated by the nuclear reactor to the anode and the submerged cathode to create an ionized oxygen plasma over the aqueous solution of the sodium metaborate and which facilitates the chemical generation of sodium borohydride.

9. A method as claimed in claim 8, and wherein the step of supplying the electrical power generated by the nuclear reactor to the anode and the cathode to create an oxygen plasma further comprises:

submerging the anode into the aqueous solution to place it in direct, fluidic, ohmic electrical contact with the aqueous solution of the sodium metaborate and water;

supplying the electrical power generated by the nuclear reactor to the submerged anode and cathode to facilitate conventional electrolysis; and

moving the previously submerged anode out of direct fluidic contact with the solution of the sodium metaborate and water to form the oxygen plasma.

10. An apparatus for creating a chemical hydride, comprising:

a pseudo-plasma-electrolysis reactor having top and bottom surfaces, and defining a cavity;

an aqueous solution formed of sodium metaborate and water, and which is received in the cavity;

a cathode mounted on the bottom surface of the pseudo-plasma-electrolysis reactor and submerged in the aqueous solution;

an anode moveably mounted on the top surface of the pseudo-plasma-electrolysis reactor and which is operable to move into, and out of fluidic ohmic electrical contact with the aqueous solution formed of the sodium metaborate and the water; and

a source of electrical power electrically coupled to the anode and the cathode, and wherein the application of the electrical power to the anode and the cathode facilitates the chemical reaction of the sodium metaborate and the water to form a chemical hydride in the solution.

11. An apparatus as claimed in claim 10, and further comprising:

a nuclear reactor which has a hot gas exhaust containing heat energy;

a first heat exchanger coupled in fluid flowing relation relative to the hot gas exhaust of the nuclear reactor, and the aqueous solution of sodium metaborate and water, and wherein the first heat exchanger absorbs the heat energy provided by the hot gas exhaust and transfers it to the aqueous solution of sodium metaborate and water to raise the temperature of the aqueous solution of sodium metaborate and water; and

a second heat exchanger coupled in fluid flowing relation relative to the hot gas output of the nuclear reactor and which absorbs the heat energy of the hot gas output, and which transfers the heat energy, so absorbed, so as to generate the source of electrical power.

12. An apparatus as claimed in claim 11, and further comprising:

a source of water coupled in fluid flowing relation relative to the second heat exchanger, and wherein the source of water, upon being exposed to the heat energy absorbed by the second heat exchanger, is converted into a source high pressure steam;

a steam turbine coupled in fluid flowing relation relative to the source of steam and which, when exposed to the high pressure steam, produces a mechanical energy output; and

a generator coupled to the mechanical energy output of the steam turbine and which generates the source of the electrical power.

13. An apparatus as claimed in claim 10, and wherein the aqueous solution is sodium metaborate and water, and wherein the electrical power generates an oxygen plasma, and wherein the chemical reaction of the sodium metaborate and the water generates oxygen gas and sodium borohydride in the aqueous solution.

14. An apparatus as claimed in claim 10, and wherein the anode is moved into fluidic, ohmic electrical contact with the aqueous solution, and is then energized by supplying the electrical power to both the anode and the cathode, and wherein an electrical current is established in the aqueous solution, and which facilitates an initial electrolysis of the aqueous solution, and wherein following the energizing of the anode and cathode which facilitates the electrolysis, the anode is moved out of fluidic, ohmic electrical contact with aqueous solution to form a plasma which enhances the chemical reaction of sodium metaborate and the water to form the chemical hydride.

15. An apparatus as claimed in claim 14, and wherein the borate comprises sodium metaborate, the plasma comprises an oxygen plasma, and the chemical hydride comprises sodium borohydride.

16. An apparatus for creating a chemical hydride, comprising:

a pseudo-plasma-electrolysis reactor having top and bottom surfaces and defining a cavity;

an aqueous solution of sodium metaborate and water received within the cavity of the pseudo-plasma-electrolysis reactor;

a cathode fixedly mounted on the bottom surface of the pseudo-plasma-electrolysis reactor and which is disposed in fluidic, ohmic electrical contact with the aqueous solution;

an anode moveably mounted on the top surface of the pseudo-plasma-electrolysis reactor and which selectively moves into, and out of fluidic, ohmic electrical contact with aqueous solution;

a nuclear reactor which has a hot gas exhaust which provides heat energy;

a first heat exchanger coupled in fluid flowing relation relative to the hot gas output and which is operable to absorb the heat energy of the hot gas exhaust flowing therethrough, and wherein the first heat exchanger is further disposed in fluid flowing relation relative to the cavity of the pseudo-plasma-electrolysis reactor, and wherein the aqueous solution flows through first heat exchanger to absorb the heat energy provided by the hot gas exhaust to increase the temperature thereof;

a second heat exchanger disposed in fluid flowing relation relative to the hot gas output and which is operable to absorb the heat energy of the hot gas flowing therethrough;

a source of water coupled in fluid flowing relation relative to the second heat exchanger, and wherein the source of water absorbs the heat energy previous absorbed by the second heat exchanger and is converted into a source of high pressure steam;

a steam turbine coupled in fluid flowing relation relative to the second heat exchanger and which is operable to receive the source of high pressure steam and produce a mechanical energy output;

a generator coupled to the mechanical energy output of the steam turbine and which generates a source of electricity which is selectively supplied to the anode and the cathode; and

an actuator coupled in force transmitting relation relative to the anode and which moves the anode into and out of fluidic contact with the aqueous solution, and wherein the actuator, when energized, moves the anode into fluidic, ohmic electrical contact with the aqueous solution, and wherein following contact of the anode with aqueous solution, the source of electricity is applied to the anode, and the cathode, to create an electrical current in the aqueous solution, and wherein the actuator is then energized to move the anode out of fluidic, ohmic electrical contact with the aqueous solution to form an oxygen plasma therebetween the anode and the aqueous solution, and wherein the formation of the plasma facilitates the chemical reaction of the sodium metaborate and water to produce oxygen gas and sodium borohydride in the aqueous solution.